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Problems still unsolved in Indo-Aryan Cosmology.—By
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To a greater extent than has been generally acknowledged Babylonian cosmology is the key to an understanding of the Indo-Aryan. In proof of this statement the student is invited to spread out before him the diagram of the Babylonian cosmos printed in the twenty-third volume of the *Journal of the American Oriental Society* (opposite p. 388), and to note the following remarkable correspondences:

1. Like the "Upper E-KUR," in that diagram, the Sumeru of the Indo-Aryans is a *mons montium*, a true "Weltberg."

2. In both cosmological systems this Weltberg is at the same time *par excellence* the possession of the gods, a Götterberg.

3. In both this Götterberg is not only divinely vast and beautiful, but also, in shape, quadrangular.

4. In both the axis of the heavens and of the earth is perpendicular in position, and consequently the top of the quadrangular Götterberg is the true summit of the earth.

5. In both this crowning summit of the earth has an antipodal counterpart in a corresponding inverted Weltberg underneath the earth. The name of this in the Indo-Aryan system is Ku-meru.¹ In Chaldæa this peculiar conception seems to have been of pre-Semitic antiquity. One of the first of Western scholars to recognize the parallelism and something of its significance for Comparative Cosmology was Lenormant, who a generation ago wrote as follows: "Dans les conceptions de la cosmologie mythique des Indiens on oppose au Sou-Merou, 'le bon Merou' du nord, un Kou-Merou mauvais et funest, qui y fait exactement un pendant et en est l'antithèse. De même les Chaldéens opposaient à la divine et bienheureuse montagne de l'Orient (accadien *'garsag-babbarra*=assyrien *šad ʿit šamši*) une montagne funeste et ténébreuse (accadien *'garsag-gigga*=assyrien *šad erib šamši*), située dans les parties basses de la terre."—*Origines de l'Histoire*, tom. ii. 1, p. 134.

¹ [Meru and Sumeru are forms found in Sanskrit literature; Kumeru is still *unbelegt*, though the conception of the antipodal mount is Puranic.—ED.]

6. In the Babylonian cosmos the upper *hemi-gæa* has seven stages; in the Indo-Aryan it has seven varṣas.

7. In the Babylonian system the lower or inverted *hemi-gæa* has seven stages; in the Indo-Aryan it has seven pātālas.

8. West of Babylonia is found the Hebrew conception of a quadrifurcate river of Paradise which flowed forth in opposite directions to water the four quarters of the pristine earth. East of Babylonia is found the Indo-Aryan conception of the Gaṅgā-stream which, descending from heaven to the top of Sumeru, there divides itself, according to the Vishnu Purāṇa, into four world-rivers, and descending the several sides of the mountain from varṣa to varṣa waters the whole earth. It is hardly possible to doubt that in both cases the conception was borrowed from the world-view of the people residing midway between the Hebrews on the one side and the Indo-Aryans on the other, or was at least common to the three.¹

9. In the Indo-Aryan, as in the Babylonian world-view, the seven divisions of the lower or inverted *hemi-gæa* can be described (as they are in the Mahā-Bhārata) as *subterranean*, and yet, at the same time, as *capable of receiving light from the sun and moon*. Our diagram clearly shows both the possibility and the entire naturalness of this.

10. In the Babylonian conception the upper or northern planetary *hemi-ouranoi* were seven in number, and each of them, in receding order away from the Weltberg, was located at an increasing interval or distance; so is it also in the Indo-Aryan cosmos.

11. According to the Babylonians, the under or southern planetary *hemi-uranoi* were also seven in number, and these, numbering from their center, were located at ever wider distances asunder; so is it also with the dvīpas in the Indo-Aryan cosmos.

12. In Babylonian thought each of the celestial spheres was assigned to the guardianship and government of a particular divine being; so was also each dvīpa in Indo-Aryan thought. (See Wilson's *Vishnu Purāṇa*, p. 162.)

¹ T. G. Pinches, *The Old Testament in the Light of Historic Records*, etc., 2d ed. 1903, pages 71-73. Alfred Jeremias, *Das Alte Testament im Lichte des alten Orients*, Leipzig, 1904, pages 102-104. F. Hommel, *Aufsätze und Abhandlungen*, p. 326 ff.

13. In the Babylonian cosmos the lower *hemi-ouranoi* are, as a group, below the seven stages of the lower *hemi-gæa*; in like manner in the Indo-Aryan, the Narakas are, as a group, below the Pātālas. (Wilson, *ibid.*, p. 207.)¹

14. At the same time, in the Babylonian system the regions included in the inverted *hemi-ouranoi* and those included in the inverted *hemi-gæa* slightly overlap. All the requirements of the system imply that the same was true in the Indo-Aryan. This feature also helps us to understand why the texts, and thus far their Occidental interpreters, present no clear and sharp distinction between the two groups as to nature or location. Possibly a similar slight overlapping may explain the failure of Egyptologists to make between *Tuat* and *Amentet* the distinction clearly implied in certain passages of the most ancient texts. See Budge's *Book of the Dead*, 1901, chap. lxiv, vol. i, p. 211.

15. In the Indo-Aryan as in the Babylonian system the lowest hells are antipodal to the highest heavens; hence the statement in the Vishnu Purāṇa (Wilson, p. 209): "The gods in heaven are beheld by the inhabitants of hell as they move *with their heads inverted*." In the Jain Sūtras also persons in hell are represented as moving about with their "heads downwards." (SBE. xlv. p. 279.) Even in Plutarch the same ancient idea survives.²

16. In both systems the diurnal movement of the sun is in a horizontal instead of a vertical plane, and night's darkness is caused simply by the passage of the sun around the farther side

¹ We may be the more certain that in the Indo-Aryan cosmos the Narakas were the lower or infernal *hemi-ouranoi* from two striking facts: (1). The fact that in the downward direction the distances of the Narakas from each other increase in an arithmetical ratio just as do the distances of the heavens in the opposite direction. (2). The fact that the normal term of life in these successive infernal abodes grows longer and longer according to distance from the cosmic center precisely as is the case in the successive celestial abodes. I have never found any text that gave such a representation of the Pātālas.

² "They [the virtuous] see the ghosts of people there turned upside down and as it were descending into the abyss." *On the Face in the Orb of the Moon*, Section 28.—That the Greek astronomers derived their conception of the mutually antipodal $\chi\theta\omega\nu$ and $\alpha\nu\tau\iota\chi\theta\omega\nu$ from the ancient Babylonians has long been clear to me. The *Chthōn* was simply the Upper E-KUR, the *Anti-chthōn* the inverted Lower E-KUR.

of the Weltberg. According to Maspero, the same apparent paradox as to the sun's motion was held and taught by the most ancient Egyptians as well as by the most ancient Chaldæans. (*Dawn of Civilization*, Eng. ed., p. 544.)

17. In both systems a cross-section of the cosmos in the plane of the equator would show seven solid horizontal world-rings, one within another, and all of them inclosing their common center. Here, possibly, was the origin of the "world-rings of rock" separated by seven intervening seas in the common description of the Buddhist world-view. It should be remembered, however, that in the Buddhist cosmography the tops of these world-rings are by no means in a common plane.

18. In both systems the order of the seven planets is not that of the matured Greek teaching of Ptolemy, but is conformed to the older Babylonian view, according to which both sun and moon are nearer to the earth than the nearest of the remaining five.

19. Precisely as in Babylonian thought the sphere of the fixed stars is far above, beneath, and beyond the seven concentric planetary globes, so in the Indo-Aryan is found, far above, beneath, and beyond the earth and all the Deva-lokas, the all-including shell of Brahman's cosmic egg.

20. Finally, as in the Babylonian, so in the Indo-Aryan cosmos, there is present and visible to every eye that most wonderful of all monuments of prehistoric astronomic science, the starry world-girdle of the twelve-signed Zodiac, attesting in both peoples a clear recognition of the great circles and the poles of the ecliptically defined celestial sphere.

In the beginning of European investigations into the astronomical and geographic ideas encountered in Sanskrit literature one of the most important of questions was this: Was the cosmological system of the Indo-Aryans of indigenous origin, or was it in its fundamentals due to Babylonian influence? In view of the twenty correspondences above enumerated it may safely be affirmed that this question is now answered.¹ As is

¹ As long ago as in the year 1890 Professor Jensen could write of the origin of the cosmic system of the Indians as follows: "Dass diese Anschauung nicht aus Persien, sondern direct oder indirect aus Babylonien stammt, zeigt die weit grössere Gleichartigkeit der babylonischen und indischen als die der persischen und indischen Ideen." *Kosmologie*, p. 184.

usual, however, in similar cases, the determination of the historic fact has immediately started a multitude of new questions relative to the time, manner, cause and meaning of the fact. These constitute so many challenges to the young on-coming scholars of a new century.

Among the problems yet unsolved in this field, one of the most interesting and important is whether, *in the beginning*, the seven dvīpas were really supposed to be continental "rings," horizontal in position. In some late documents they appear to be so represented, and yet there seems also to be some evidence going to show that in a prehistoric period the authors of Indian cosmology on the East, like Pythagoras and succeeding astronomers of Greece on the West,¹ borrowed from the Babylonians the idea of seven concentric globes, "crystalline spheres," presided over respectively by the seven planetary divinities.²

For example, such treatises as the Sūrya-Siddhānta pronounce the first in the order of the dvīpas a globe. But if the dvīpa that in all enumerations is the first of all and the most central of all was a globe, it is a natural *a priori* expectation that the remaining six members of the class will be found to be, or once to have been, globes also.

Again, if in the beginning the series consisted of seven concentric crystalline spheres, like the Babylonian, the second of them, Plakṣa, would correspond to the Babylonian lunar sphere, the globe of the moon-god Sin. Like that it would be conceived of as perfectly transparent, and hence like the others invisible.

¹ "Pythagoras apud Chaldaeos conversatus est."—Diogenes Laert, *De Vitis Philos.*, lib. viii. c. 1.

² [There is no objection to the assumption that the rather late literature cited below in support of this hypothesis may contain elements much older than the present texts: but both the Sūrya-Siddhānta and the Vishnu Purāṇa are so full of ideas foreign to early Hindu conceptions as greatly to invalidate their testimony in evidence of what was original or borrowed "in a prehistoric period." The Sūrya-Siddhānta may be referred to c. 300 A. D.; the Vishnu Purāṇa, in its present form, to c. 400; though a list of eighteen Purāṇas was probably known before that. At most, however, the cosmography of these works, as of the Mahābhārata, can be utilized for historical purposes only with the understanding that the data belong in all probability to a time subsequent to the Christian era. Thus in section eight (above), the conception of a four-fold division of Gaṅgā is a Puranic modification of the earlier three-fold (divided) Gaṅgā.—Ed.]

The *visible* lunar disc would doubtless be thought of, as it was in Babylonia, as the moon-god's "Ship of Light," the vehicle in which in sacred state he made his nightly journeys round and round upon his spacious earth-inclosing sphere, lighting at the same time the central world of men within. In Babylonian thought the only natural passages into or out of this earth-enclosing lunar sphere were one through a north polar gate on the "Way of Anu," and one through a south polar gate on the "Way of Ea." Three items almost seem to imply that the original conception of Plakṣa was in correspondence with this.

First, while in the Vishnu Purāṇa Vishnu is naturally represented as worshipped in all the dvīpas below Brahman's, he is said to be worshipped in Plakṣa in the form or person of Soma, the moon.

Second, in the account of the descent of Gaṅgā from the throne of Vishnu in the north polar heavens, the celestial stream is represented as falling on and "washing the lunar orb" before it reaches the top of Meru at the north pole of the earth. (Wilson's *Vishnu Purāṇa*, p. 170 and 228.) Of course the only lunar orb that the celestial waters in making this direct descent at the pole could possibly encounter and wash would be one overarching the whole northern hemisphere of the earth, precisely as did the globe of the moon-god Sin.

Third, the Southern Buddhists, in some of their texts, almost seem to have retained an older Hindu idea of the same kind, for it is said of Yugandhara, the dvīpa which in their system corresponds to Plakṣa: "The region of Yugandhara covers, as a vaulted cope, the whole of these divisions." (Edward Upham, *History and Doctrines of Buddhism*, p. 77.¹) Speaking from any standpoint on the surface of E-KUR this would perfectly apply to the globe of Sin.

That the remaining (the extra-lunar) dvīpas were originally globes, and not annular discs, seems almost implied in the fact that according to the Purāṇas each, with the exception of the outermost, had divisions of its surface corresponding in number

¹ Of the value of the text thus rendered by Upham or of the correctness of the rendering, the present writer has no means of forming an opinion, but it may at least be said that Dr. Upham had no discoverable inducement to attempt to represent Yugandhara as a globe.

and apparently in form with those of the spherical Jambudvīpa. This could not be the case were the dvīpas merely annular discs. Furthermore, in the description of them given to Dr. Edward Upham by the Buddhist high priest of Ceylon, their undersides are represented as corresponding to the upper, which would imply antipodal regions similar in outline and equal in extent to the regions belonging to the upper or north polar half of the cosmos as a whole (*loc. cit.* p. 86). Finally, in a prize essay printed in the Asiatic Researches in 1849, Babu Shome, a native Indian teacher, closes a description of the dvīpas as follows: "The seven divisions [varṣas] in each of the continents [dvīpas] are separated by seven chains of mountains, and seven rivers, lying breadthways, and placed at such inclination in respect to one another, that if a straight line be drawn through any chain of mountains or rivers on the other continents and produced toward the central isle it would meet the center of the earth." These terms certainly seem to imply, not only that the dvīpas were concentric globes, but also that the varṣas of each, and the pātālas of each, and the mountain ridges by which in each the varṣas and pātālas were respectively bounded, were all in such perfect correspondence in the system that a right line in any direction from the center point of the earth would, if sufficiently produced, pass through an identically shaped varṣa or pātāla, or an identically placed mountain range, in each of seven concentric spheres. Babu Shome does not give his textual authority, but, though a Christian convert, he was in constant touch with the chief Brahmin teachers of Calcutta in his time. Surely the authorship and the warrant of so incomparably elaborate and beautiful a world-concept as this calls for an early and exhaustive investigation.¹

¹ In the Kalpa Sūtra of Bhadrabāhu (SBE. vol. xxii. pp. 227-229). Harihargamesi is represented as flying "*upwards*" in a straight line from Jambudvīpa to the heavenly council-chamber and throne-room of Śakra, yet as passing on his way "*right through numberless continents and oceans.*" His previous descent from Śakra's heaven was also "*right through numberless continents and oceans.*" Neither of these representations is at all compatible with Indian cosmology as commonly interpreted. On the other hand, once conceive of the dvīpas as originally concentric globes, and allow for an exaggeration merely in the number, and the representations perfectly fit the requirements of the world-view.

Another problem which still awaits solution is the following: When, where, and under what influences in the development of the Buddhist form of the Indo-Aryan cosmology did the term Jambudvīpa cease to designate the central one of all the spheres and come to mean merely one of four diversely shaped, but symmetrically located, islands far out in the outermost of the seven world-seas? The "nebular hypothesis" may explain how an *outermost* revolving ring may break up and gather itself together into a planetary mass, but who can tell us when, where, and how this central Jambudvīpa got itself first plucked out of the center of the total cosmic system, then contracted to the dimensions of the Buddhists' triangular isle, and finally towed out and anchored in the world-engirdling sea? One's first thought is that this revolution in cosmological thought must have taken place in consequence of the transference of the center of Buddhist consciousness from continental India to insular Ceylon; but even this consideration fails to relieve the utter unthinkableness of the change that crowded six or seven enormously extended world-rings and world-seas into the narrow space between Ceylon and the Asian mainland.

A further problem remains, the investigation of which cannot fail to throw light upon the one just mentioned. It relates to the cosmology of the Jains. It asks: Wherein at the beginning did the Jain cosmology agree with, and wherein differ from, that presented in the Epic and Puranic texts? When and why did it take on the modifications which now differentiate it from the traditional teaching of the modern Brahmins on the one hand and from the Buddhist cosmology on the other?

These questions have not yet received the attention they deserve. Of one of the most important of the texts affording data for their solution Weber had nothing more or better to say than that it contains "nur mythische Phantastereien." (*Indische Studien*, xvi, 390.) Even Professor Thibaut, in his excellent work on the astronomical and related ideas of India, makes no effort to trace the origin or significance of that strange doctrine of the earth's two suns and two moons found in the Jain astronomies (as it was also in the teaching of some of the Greek astronomers),¹ but dismisses the whole subject with the cool

¹ "They (the Jains) similarly allot twice that number to the salt ocean, six times as many to Dhātuci Dvīpa, 21 times as many to the

remark that this peculiarity of the system is "ohne Belang" (*Grundriss*, iii. 22).

Other peculiarities of the Jain cosmology well deserve investigation both by themselves and according to comparative methods. Such, for example, is the enumeration of the Canda-dīva and the Sūra-dīva in due order after Jambuddīva, and yet the making of Dhāyāsaṇḍa, beyond the Lavaṇa sea, the second in the normal series of the dvīpas. Another is the bringing down of Puṣkara from the seventh place in the original series to the third, and the new definition of the Maṇussa-Khetta connected therewith. (E. Leumann, *Indische Studien*, xvi. 390-392).

Possibly we may never obtain the data required for the solution of the several problems mentioned in the foregoing paper. It is encouraging, however, to remember that in every field of knowledge the clear formulation of the questions next needing to be attacked often proves to be a most helpful preliminary to new discoveries.

Cālōdadhi, and 72 of each to Pushkara Dvīpa." F. Buchanan, in *Asiatic Researches*, vol. ix. p. 322. According to Hardy's *Manual of Buddhism*, pp. 20 and 22, footnote, they also locate the moon eighty yojanas above the sun instead of one yojana below it.

To section 13, above, p. 86: It may be added that the Rabbinical conception of two south-polar Gehennas (Eisenmenger, *Entdecktes Judenthum*, p. 328f.), the one terrestrial and the other celestial (the two exactly answering to two north-polar Paradises, one terrestrial and the other celestial) is clearly a survival of the ancient Babylonian idea. Brief citations may be seen in Budge, *The Gods of the Egyptians*, 1904, i. 273 f. The terrestrial Gehenna perfectly corresponds to the Indian Pātālas as above interpreted, the celestial to the Narakas.